



**USAID** | **JORDAN**  
FROM THE AMERICAN PEOPLE

## **USAID Water Reuse and Environmental Conservation Project**

### **Solid Waste Management— Kingdom-Wide Opportunities for Improvements**

8 May 2014

*Implemented by AECOM*





## AGENDA

- Waste Processing
  - Current situation in Jordan
  - Opportunities for improvements
- Waste Disposal
  - Current situation, active landfills
  - Current situation, closure of old landfills
  - Opportunities for improvement
- Regulations





## WASTE PROCESSING— CURRENT SITUATION

- Waste pickers
  - Garbage bins throughout city
  - At landfills
- Minimal experience with waste recycling facilities
- Kingdom-wide approach to be determined





## WASTE PROCESSING—IMPROVEMENTS

- Replace scavenging with MRF
  - Safer working conditions
  - Increased efficiency
- Develop refuse derived fuel facilities when feasible
- Private sector opportunity



Material Recovery Facility Tadweer MRF in Amman





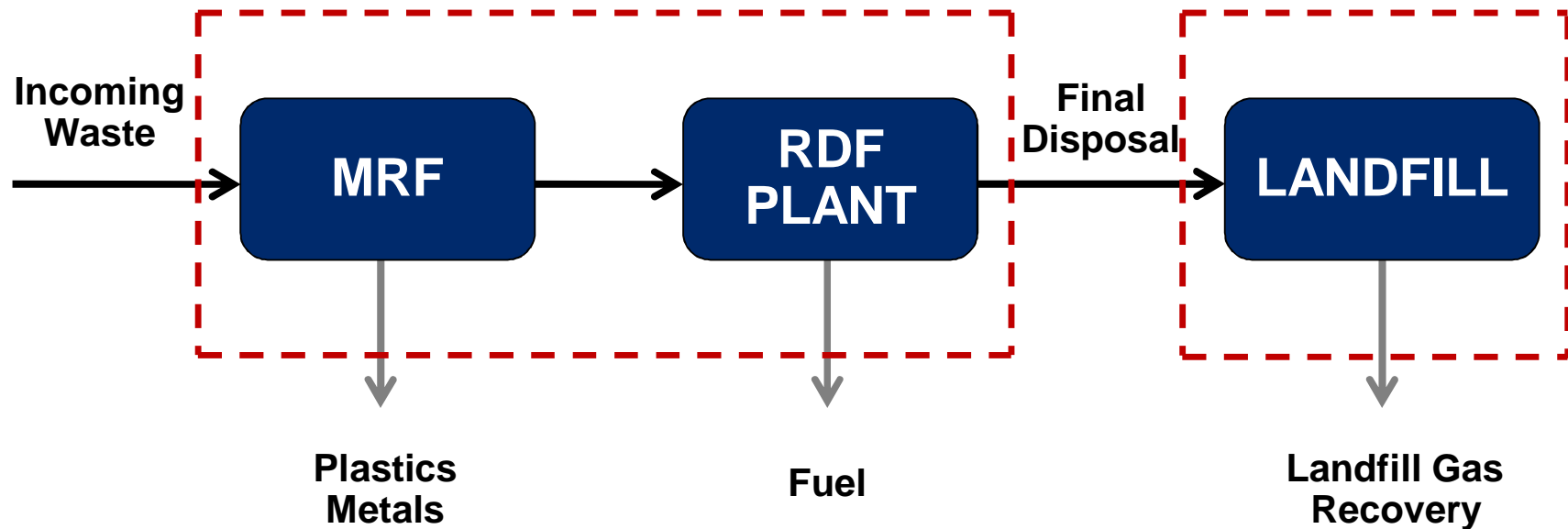
## WASTE PROCESSING—IMPROVEMENTS

- High BTU content material can be converted to Refuse Derived Fuel
- Additional waste processing can be introduced later such as Anaerobic Digestion and Composting





## PROPOSED WASTE MANAGEMENT PLAN





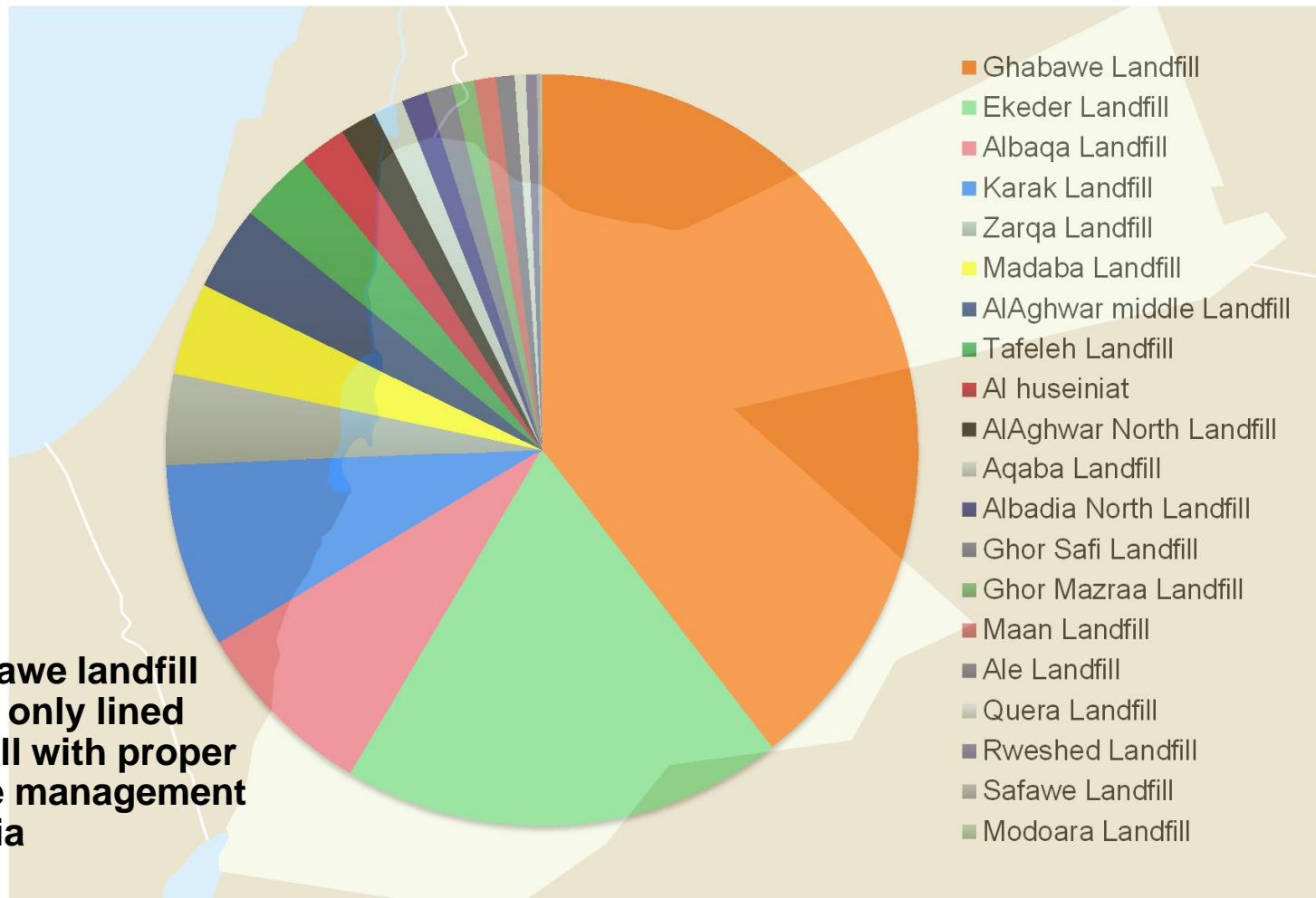
## AGENDA

- Waste Processing
  - Current situation in Jordan
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- **Waste Disposal**
  - Current situation, active landfills
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  - Opportunities for improvements
- Regulatory





## ACTIVE DISPOSAL SITES

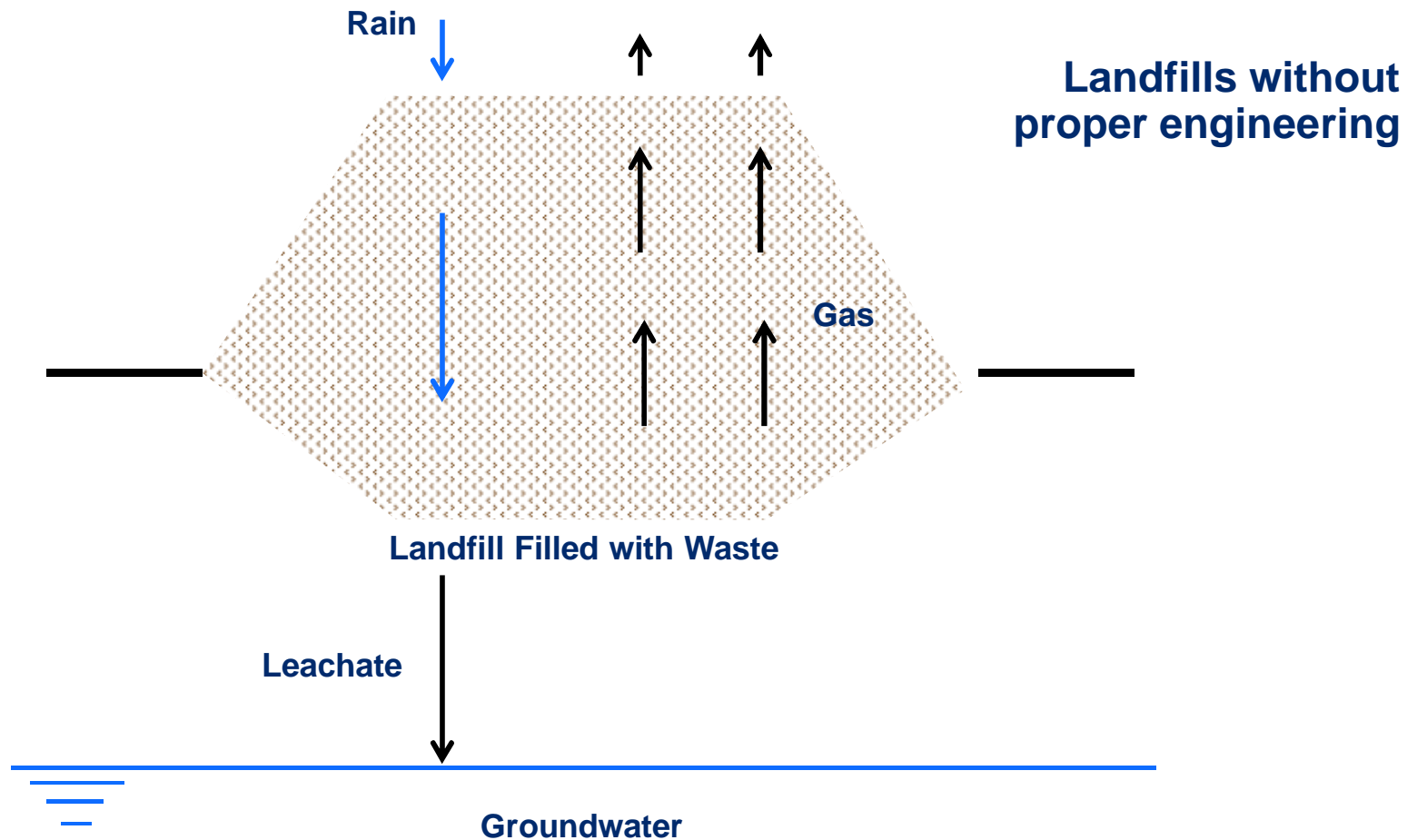


**Ghabawe landfill is the only lined landfill with proper waste management criteria**



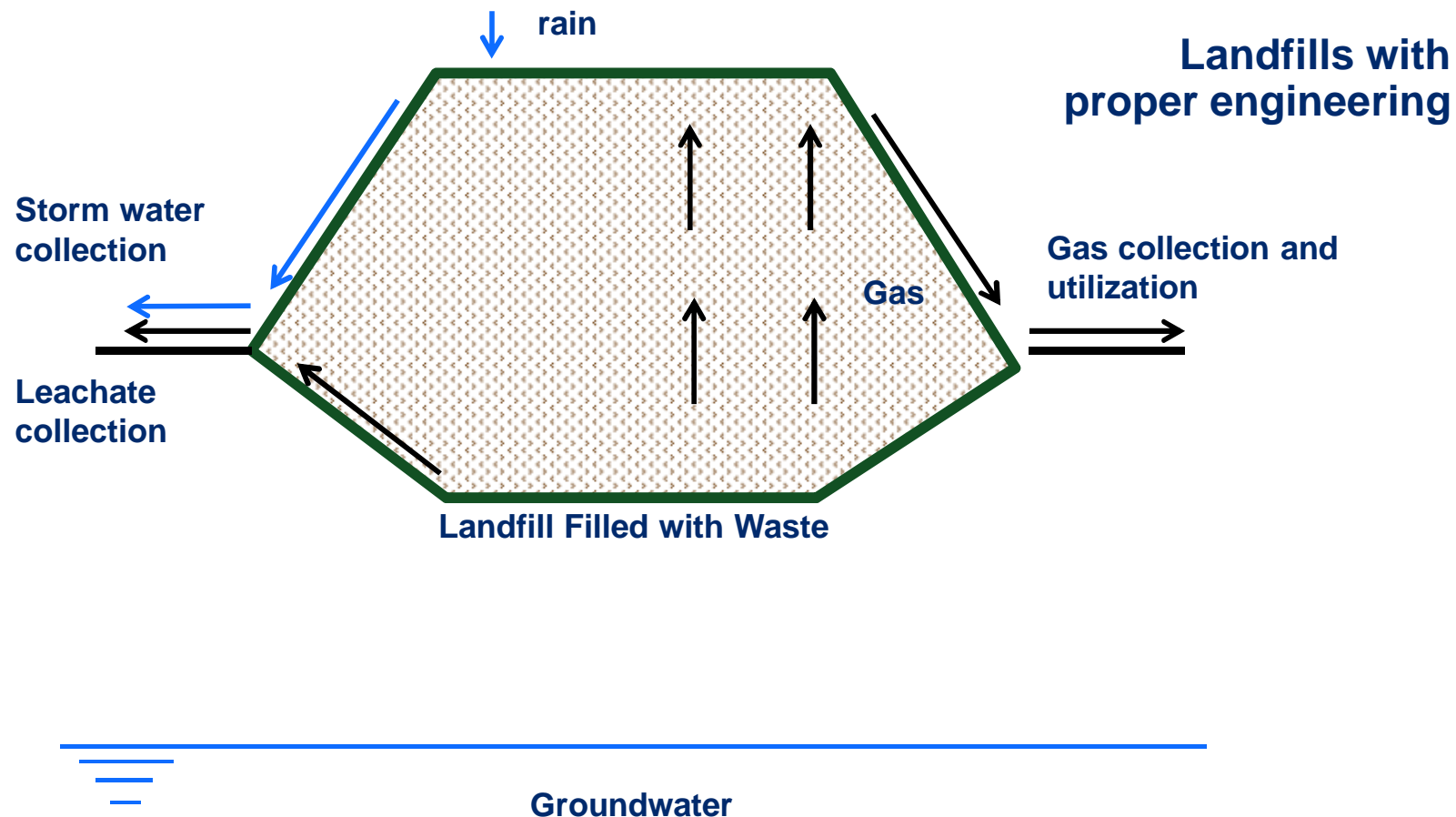


## CURRENT SITUATION AT ACTIVE LANDFILLS





## CURRENT SITUATION AT ACTIVE LANDFILLS





## IMPROVEMENTS AT NEW LANDFILLS

- Adopt design, construction, and operation criteria for landfills
- Use low-cost local materials and techniques for liner and cover systems
- Train landfill managers and operators
  - Landfill managers in other countries must be certified





## **CURRENT SITUATION— CLOSURE OF OLD DISPOSAL SITES**

- Lack of planning during landfill construction and operation creates problems during closure
  - Dimensions of waste mass not documented
  - Shape of waste mass not optimal for gas production
  - Shape of waste mass not suitable for storm water drainage
- Landfill closure becomes site remediation project
- No funding available for closure





## Old Disposal Site

- No proper protection for ground water & atmosphere
- No proper fencing or protection for neighbors
- Landfill fires





## IMPROVEMENT FOR CLOSURE OF OLD DISPOSAL SITES

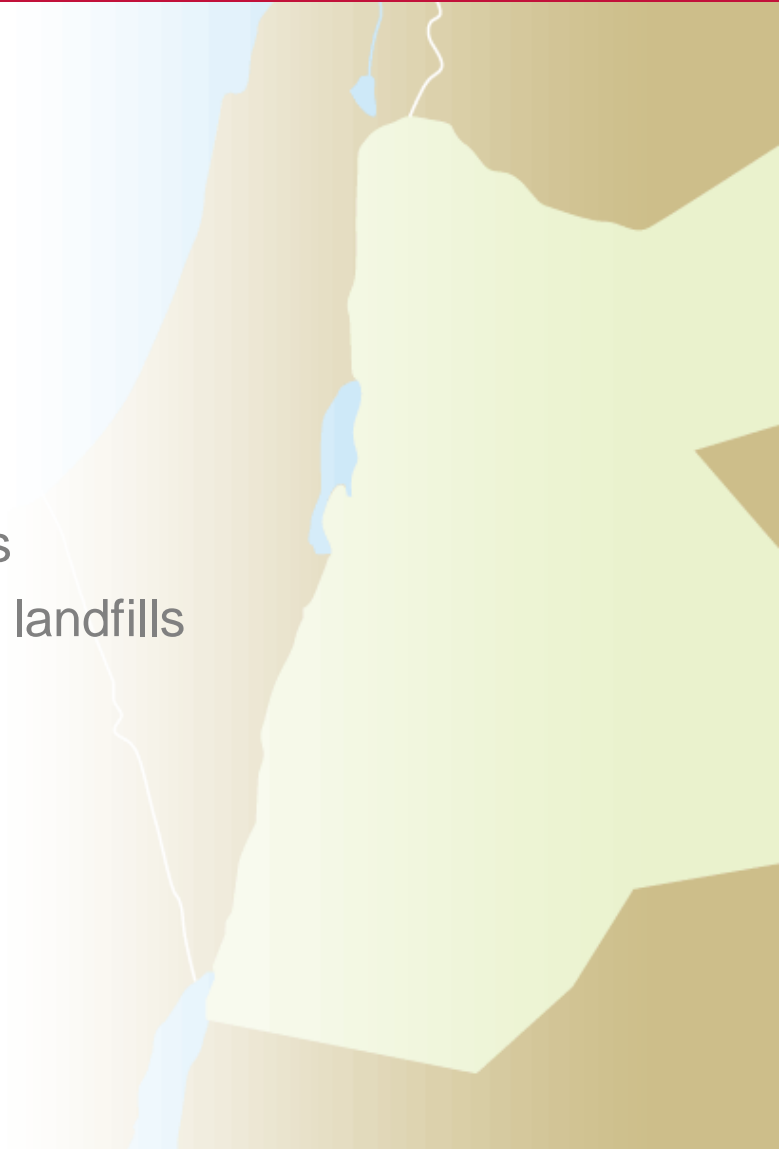
- Use local, low-cost material to cap cells
- Closed Landfill Site with proper planning
  - Shape is stable
  - Allows collection of gas
  - Shape drains water away from waste





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- Waste Processing
  - Current situation in Jordan
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- Waste Disposal
  - Current situation for active landfills
  - Current situation for closure of old landfills
  - Opportunities for improvements
- **Regulations**

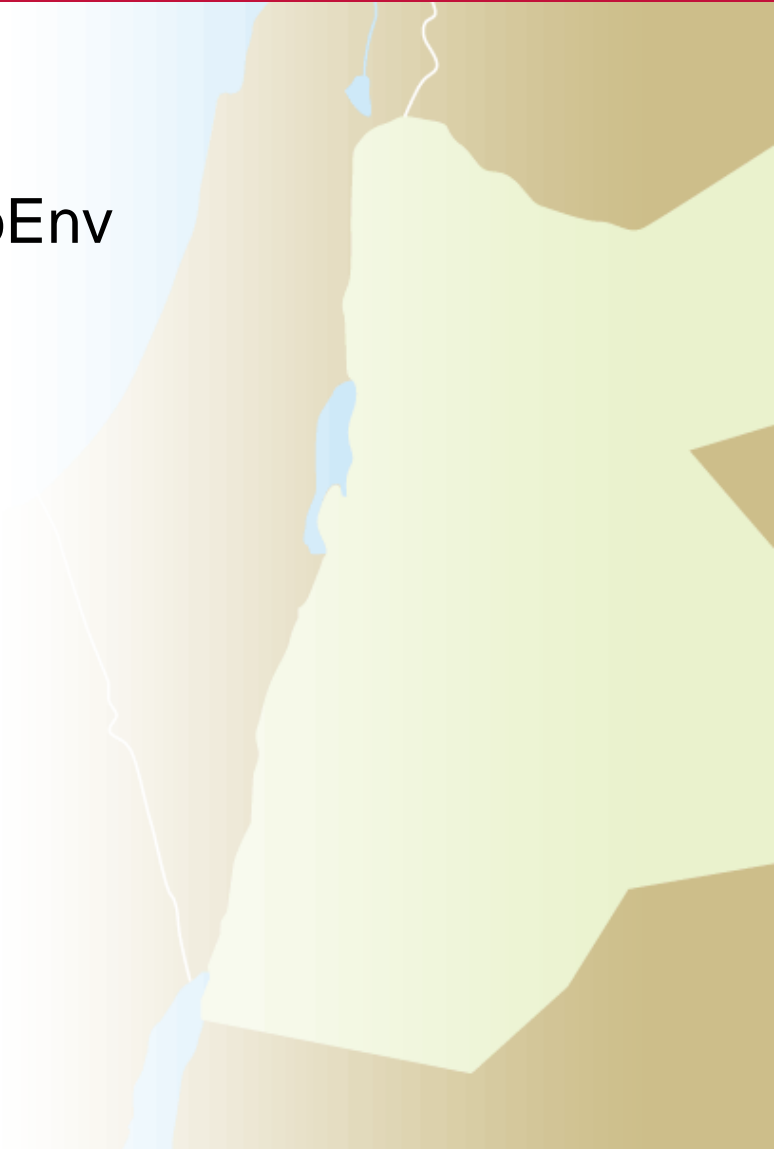




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## REGULATIONS

- Current regulations give the MoEnv power to monitor and regulate
- Other agencies implement





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## REGULATIONS

نظام رقم (٢٧) لسنة ٢٠٠٥

نظام ادارة النفايات الصلبة

صادر بمقتضى البند (٨) من الفقرة (أ) من المادة (٢٣)

من قانون حماية البيئة رقم (١) لسنة ٢٠٠٣

المادة ٤- تتولى الوزارة ، بالتعاون والتنسيق مع الجهات المختصة بإدارة النفايات

الصلبة المهام والصلاحيات التالية :-

أ- اعداد الخطط الخاصة بإدارة النفايات الصلبة ووضع البرامج اللازمة

• لتنفيذها

ب- تحديد مواصفات المعدات المستعملة لإدارة النفايات الصلبة وشروط

جمع هذه النفايات وفرزها ونقلها وتخزينها وتدويرها ومعالجتها والتخلص

• منها

ج- تحديد طريقة إعادة تأهيل مكب النفايات الذي يتم اغلاقه •

د- اجراء الدراسات وجمع المعلومات المتعلقة بإدارة النفايات الصلبة

وتبويبها وتحليلها وتقديم الاقتراحات بشأنها •

هـ- تنظيم حملات النظافة العامة •

و- تنفيذ البرامج الخاصة بالتدريب والتوعية في مجال ادارة النفايات

• الصلبة



## REGULATORY

### Solid Waste Regulations Regulation no 27 (2005)

***(Article - 4)** The ministry (MoEnv) in coordination with the entities specialized in waste management shall:*

- A.** Prepare plans for Managing solid waste and develop the necessary programs to implement these plans
- B.** Determine the specifications of equipment to be used in waste management and ways of collecting the waste, separating recyclables, storing waste, recycling waste, treatment of waste, and final disposal of waste
- C.** Specify the method of rehabilitation of closed landfills
- D.** Develop studies and collect information about different waste types and propose solutions
- E.** Organize public cleaning campaigns
- F.** Implement programs of training and awareness related to Solid waste management

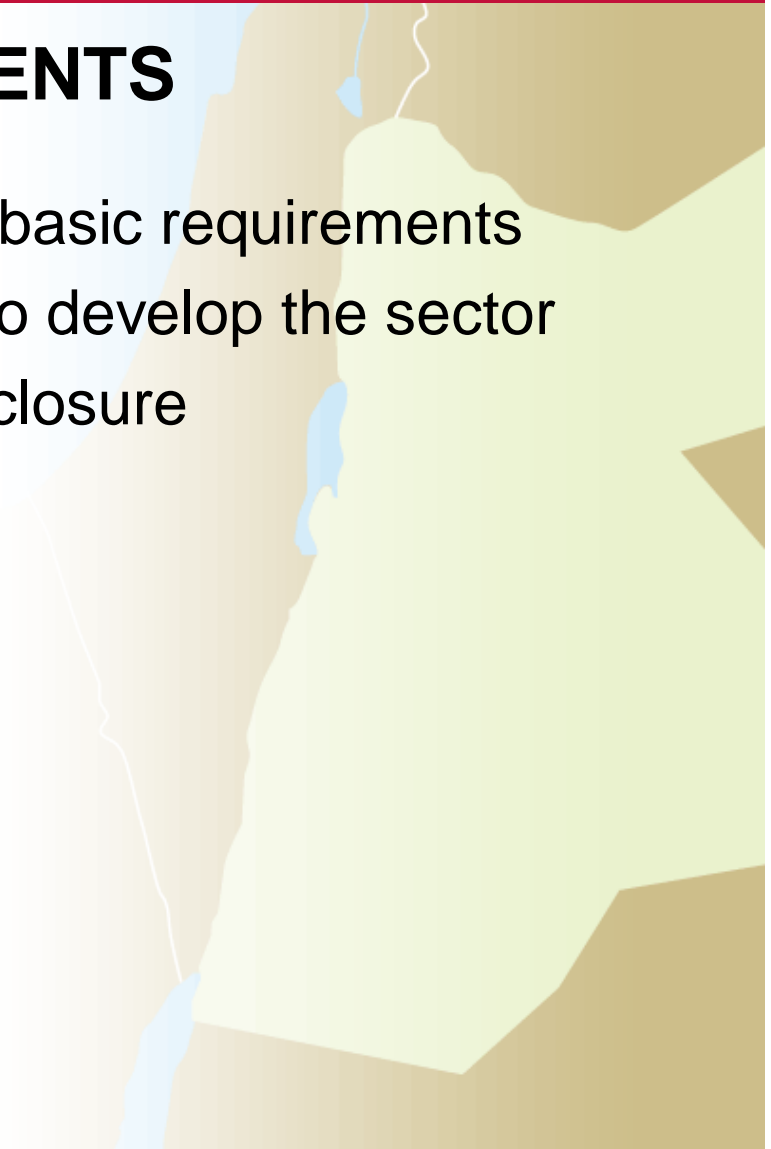




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## REGULATORY IMPROVEMENTS

- Current regulation covers most basic requirements
- More detailed could be helpful to develop the sector
- Include financial assurance for closure





## EXAMPLE OF FINANCIAL ASSURANCE

ANCE WITH § 258.51(c).

### § 258.73 Financial assurance for corrective action.

(a) An owner or operator of a MSWLF unit required to undertake a corrective action program under § 258.58 of this part must have a detailed written estimate, in current dollars, of the cost of hiring a third party to perform the corrective action in accordance with the program required under § 258.58 of this part. The corrective action cost estimate must account for the total costs of corrective action activities as described in the corrective action plan for the entire corrective action period. The owner or operator must notify the State Director that the estimate has been placed in the operating record.

(1) The owner or operator must annually adjust the estimate for inflation until the corrective action program is completed in accordance with § 258.58(f) of this part.

(2) The owner or operator must increase the corrective action cost estimate and the amount of financial assurance provided under paragraph (b) of this section if changes in the corrective action program or MSWLF unit conditions increase the maximum costs of corrective action.

(3) The owner or operator may reduce the amount of the corrective action cost estimate and the amount of financial assurance provided under paragraph (b) of this section if the cost estimate exceeds the maximum remaining costs of corrective action. The owner or operator must notify the State Director that the justification for the reduction of the corrective action cost estimate and the amount of financial assurance has been placed in the operating record.

(b) The owner or operator of each MSWLF unit required to undertake a corrective action program under § 258.58 of this part must establish, in a manner in accordance with § 258.74, financial assurance for the most recent corrective action program. The owner or operator must provide continuous cov-

### § 258.74 Allowable mechanisms.

The mechanisms used to demonstrate financial assurance under this section must ensure that the funds necessary to meet the costs of closure, post-closure care, and corrective action for known releases will be available whenever they are needed. Owners and operators must choose from the options specified in paragraphs (a) through (j) of this section.

(a) *Trust Fund.* (1) An owner or operator may satisfy the requirements of this section by establishing a trust fund which meets the requirements of the trust must be an authority to a trust operator. The trust must be examined by a copy of the placed in record.

(2) Payments must be made by the owner or operator over the permit or over the MSWLF unit in the case of a post-closure. The estimate of the corrective action program for the period is referred to as the pay-in period.

(3) For a demonstration of financial assurance and post-closure care and corrective action for known releases will be available whenever they are needed. Owners and operators must choose from the options specified in paragraphs (a) through (j) of this section. The amount of subsequent payments must be determined by the following formula:

Next Payment =  $[CE - CV]/Y$

where CE is the current cost estimate for closure or post-closure care (updated for inflation or other changes), CV is the current value of the trust fund, and Y is the number of years remaining in the pay-in period.

Part of USA's Solid Waste Federal Regulations

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